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APPLICATION NO.	FILING DATE	FIRST-NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/125,128	08/11/1998	YUICHIRO IGUCHI	1084-98	7453

35811 7590 06/16/2003

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EXAMINER

CLEVELAND, MICHAEL B

ART UNIT

PAPER NUMBER

1762

DATE MAILED: 06/16/2003

35

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/125,128

Applicant(s)

IGUCHI ET AL.

Examiner

Michael Cleveland

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 7-23, 25-31, 33, 35, 37, 38, 40, 41, 43, 45, 46, 48-51 and 53-60 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-23, 25-31, 33, 35, 37, 38, 40, 41, 43, 45, 46, 48-51 and 53-60 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other:

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/28/2002 has been entered.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-4, 7-23, 25-31, 33, 35, 37-38, 40-41, 43, 45-46, 48-51, and 53-60 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 1, 2: The newly presented limitation "continuously coating" is not supported by the disclosure as originally filed. There is no indication that the coating process is necessarily continuous. The issue is compounded by Applicant's arguments that the meaning of the term "continuously" excludes screen printing. (See below.)

Claims 33, 58: The newly presented limitation "continuously supply (phosphor) paste(s)" is not supported by the disclosure as originally filed. There is no indication that the supply is necessarily continuous.

Claims 1, 2, 33, and 58: The full scope of the newly presented limitation "640 to 2000 outlet holes" is not supported by the specification as originally filed. The presence of examples within a claimed range does not fully support the entirety of the range.

Claim 2: The term "640 to 2000 outlet holes for one of red, green, or blue phosphor paste" is further unsupported.

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The remaining claims are rejected merely for containing the new limitations of parent claims 1, 2, 33, and 58.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-4, 7-23, 25-31, and 59-60 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-2: The metes and bounds of the limitation "continuously coating" are unclear. Applicant argues that the term excludes screen printing. However, screen printing is a process in which a squeegee continuously travels across a screen, pushing paste through outlet holes. Therefore, the broadest reasonable interpretation of "continuously coating" is inclusive of screen printing.

Claims 3-4, 7-23, 25-31, and 59-60 are rejected under these grounds only for the flaws of parent claims 1, 2, and 12.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-4, 7, 9, 11, 16, 21-22, 26 and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinoda et al. (U.S. Patent 5,674,553, hereafter '553).

Claims 1-2, 7: '553 teaches a method of applying a phosphor paste containing a phosphor powder and an organic solvent through a plurality of outlet holes onto a substrate with a plurality of barrier ribs to form a phosphor layer (col. 19, line 66-col. 20, line 7 and Figs. 22A-C). Three pastes may be used to form red, green, and blue stripes. The pastes are then heated to form the phosphor layers (col. 20, line 35-48). Screen printing is a process in which a squeegee

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continuously travels across a screen, pushing paste through outlet holes. Therefore, the broadest reasonable interpretation of "continuously coating" is inclusive of screen printing.

'553 does not explicitly the use of 640-2000 holes. However, the number of holes depends on the size and pattern of the panel to be coated. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the desired number of holes prior to coating.

Claim 30: The width and pitch of the ribs control the resolution of the display panel. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized them for the desired resolution. '553 explicitly teaches a barrier pitch of 220 microns, widths of 40-80 microns (col. 19, lines 49-60) and height of 100 microns (col. 19, line 8-17).

Claims 1, 3 and 11: As described above, '553 teaches a pitch of 220 microns. Also, the electrode width is taught to be 60-70 microns. In such an embodiment, the spacing between ribs must be greater than 60 microns but less than 220. '553 teaches that it is undesired to deposit the phosphor paste on top of the barriers. Thus, the outlet holes should be smaller than the pitch.

'553 teaches that screens with hole openings of 60 microns may be used to print other pastes (col. 19, lines 49-60). One of ordinary skill in the art would have expected to be able to use such a screen to print a phosphor paste with the expectation of success. In such a case, the diameter of the holes would be less than the spacing between the ribs. Both would be between 10 and 500 microns.

Claim 4: A screen printer is a paste applicator with a plurality of holes in a flat screen.

Claim 9: The openings are formed at a pitch triple that of the ribs (col. 19, lines 61-65).

Claim 16: The phosphors are applied consecutively and dried (col. 20, lines 36-48).

Claim 21: The phosphor paste should contain 10-50 wt. % phosphor and may contain a resin binder and organic solvent. The relative concentrations of the thickener and solvent will necessarily affect the viscosity of the paste (and therefore the printing effectiveness) and the necessary drying time. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the concentrations of the phosphor, binder, and solvent to control the rheological properties and drying time of the process.

Claim 22: The paste may include a cellulose resin (col. 20, lines 5-7).

Claim 26: The phosphor height, width, and pitch and phosphor concentration are all result-effective variables, as discussed above. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the parameters to have controlled the resolution and rheological properties.

Claim 31: The ribs may be black on top (col. 12, lines 59-64).

Claim 60: '553 teaches that the desired phosphor film thickness is preferably from 10-50 microns (col. 19, lines 33-48). While there is no teaching regarding the ratio of the thickness of the layer on the bottom (T1) and the side wall (T2), any values independently chosen from the range necessarily produce a ratio of  $0.2 \leq T1/T2 \leq 5$ . '553 explicitly teaches a barrier pitch of 220 microns (col. 19, lines 49-60).

8. Claims 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over '553 as applied to claims 1 and 2 above, and further in view of Osaka et al. (U.S. Patent 5,277,840, hereafter '840).

'553 does not teach Applicant's specifically claimed ranges of the grain size, specific surface area, or paste viscosity.

'840 teaches that the particle size and viscosity of phosphor pastes are known to affect the light-emitting characteristics and resolution (col. 3, lines 8-39 and Abstract). The size distribution necessarily affects the specific surface area. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the size distribution, specific surface area and paste viscosity of '553 for the best light-emitting characteristics and resolution.

9. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over '553 as applied to claims 1 and 2 above, and further in view of Yamaura et al. (U.S. Patent 4,680,231, hereafter '231).

'553 does not teach the use of a photosensitive component in the phosphor paste. '231 teaches that phosphor pastes may include photosensitive components in order to perform further photolithographic processing. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a photosensitive component in the phosphor paste of '553 in order to make the process more flexible by allowing further patterning by photolithography (for example, to remove, undesired material from the tops of the barrier ribs) (Abstract, col. 6, line 42-col. 7, line 10).

10. Claims 1-4, 7-9, 11-17, 19, 21-22, 26-27, 30-31, 33, 35, 37-38, 40-41, 43, 48-49, 51, 53-56, and 58-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanto et al. (U.S. Patent 5,921,836, hereafter '836).

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Claims 1-2, 7, 33, and 40: '836 teaches a method of forming a plasma display panel using a paste applicator with a plurality of nozzles (and therefore a plurality of holes) to deposit a phosphor paste including an organic binder to form a phosphor layer on a substrate with a plurality of barrier ribs (col. 4, lines 16-39). The phosphors may be of three colors (red, green, and blue), applied as stripes, and dried (col. 1, line 58-col. 2, line 12). The dried films coat the substrate, anode, and sides of the barrier ribs. See, for instance, Fig. 1.

'836 teaches an apparatus comprising a platform for fixing the substrate, a paste applicator with a plurality of holes, a supply means for supplying the paste to the applicator and a moving means to three-dimensionally move the platform substrate and applicator relative to each other (col. 4, lines 8-56). There is no suggestion that the supply of paste to the nozzles is interrupted, and therefore the supply appears to be continuous. The distance between the ribs and nozzle tips is kept constant (col. 6, lines 3-14). The apparatus has means to adjust the inclination degree of the applicator nozzles (col. 12, lines 40-49).

'836 explicitly teaches that there may be 5-30 nozzles (col. 4, lines 26-39), but does not explicitly teach the use of 640-2000 nozzles. However, given that there are many stripes to be formed (see, e.g., col. 8, lines 1-2), it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used more nozzles in order to have decreased processing time.

Claim 3: '836 suggests using a substrate with a spacing S of 170 microns and D of 100 microns (col. 4, lines 36-39).

Claim 4: The applicator holes may be formed as nozzles (col. 4, lines 26-39).

Claims 8, 13, 21, 26-27, and 30: '836 does not explicitly teach Applicant's claimed ranges of the outlet hole pitch, phosphor paste compositions or viscosities, barrier rib characteristics, and spacing between stripes. The resolution is affected by variables such as the distance between stripes of different colors, barrier height, width, and pitch. The viscosity of the paste is affected by the composition of the paste (col. 4, lines 16-20, col. 7, line 66-col. 8, line 19). The outlet hole pitch is determined by the rib pitch (col. 11, lines 41-59). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized these characteristics for the desired resolution and paste thickness.

Claims 14-15: '836 does not explicitly teach Applicant's claimed multiple paste applicators. In the embodiment of Fig. 18, the pastes are applied in opposite directions. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied them both simultaneously with independent applicators and at the same speed to have reduced the total processing time.

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Claim 9: The hole pitch may be six times the barrier pitch (col. 11, lines 45-53).

Claim 11: '836 suggests a hole diameter of 100 microns (col. 4, lines 30-34).

Claims 12 and 59: The clearance (distance between the nozzle tips and barrier top) should be kept constant. Typical values are 0.1-0.2 mm (col. 6, lines 3-13).

Claim 16: Each color phosphor paste may be applied and then dried separately (col. 1, line 58-col. 2, line 12).

Claims 17 and 59: The substrate and nozzle may be moved parallel to each other (col. 4, lines 49-53).

Claim 19: '836 does not explicitly teach Applicant's claimed order of application. The coating process begins outside of the region of effective display (col. 6, lines 35-41), apparently so that nonuniformities during the beginning of the deposition are not seen in the final product. By extension, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have continued movement beyond the effective region at the end of each stripe as well to prevent nonuniformities at the end of the process. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have begun moving the nozzle before deposition and stopped after deposition ceased in order to avoid nonuniformities in the effective region of the display panel.

Claim 22: The paste may contain ethyl cellulose (a binder resin) (col. 4, lines 16-20).

Claim 31: The top of the ribs may be colored black (col. 5, line 59-col. 6, line 2).

Claim 35: The shape of the holes is a design choice. It has been held that difference in configuration are not patentable absent persuasive evidence that the particular configuration is significant. See MPEP 2144.04. IV. B. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a non-circular nozzle with the expectation of similar results.

Claims 37-38: Figs. 15 and 16 suggest that the outlet holes are on the same plane and identical in form.

Claim 41: The hole pitch is determined by the pitch between the ribs, which is itself a cause-effective variable (col. 11, lines 45-53).

Claim 43: '836 suggests a hole diameter of 100 microns (col. 4, lines 30-34).

Claim 49: Figs. 16 and 22 suggest a distribution system in which one storage section is used to dispensed paste to multiple nozzles. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used multiple nozzles to distribute the



multiple phosphors simultaneously in order to reduce the processing times. In such an embodiment, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have three staggered sets of nozzles, each set with its own distribution system to supply different colored phosphors in order to reduce the processing time by applying all the stripes simultaneously.

Claims 48 and 58: Multiple applicators may be provided to apply the phosphors in series (Fig. 13).

Claim 51: The apparatus may have means to detect the position of the tips of the outlet holes and the tops of the barrier ribs (col. 6, lines 3-20) and means to control the area of application (col. 6, lines 3-50).

Claim 53: The apparatus has means to detect the position of the phosphor paste (col. 7, lines 24-32).

Claim 54-55: The apparatus comprises means to recognize alignment marks that determine the positions of the ribs and grooves (i.e., spaces) so that the phosphor may be deposited in the grooves (col. 5, line 48-col. 6, line 2).

Claim 56: Clogging of the nozzles may occur (col. 9, lines 59-62). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included means to clean the nozzle to remove such clogs.

11. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanto '836 as applied to claims 1 and 2 and further in view of Ravi-Chandar et al. (U.S. Patent 5,656,574, hereafter '574)..

'836 teaches the method of claims 1 and 2 as described above. '836 does not describe the use of outlet holes with a length/diameter ratio of 0.1-600.

The Examiner takes official notice that the length to diameter ratio of a nozzle for dispensing pastes is known to affect the rheological properties and therefore the dispensing efficiency of the nozzle. See, for instance, the extrusion process described in '574, col. 6, lines 40-49. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the length-to-diameter ratio of the paste applicator of '836 for the optimum rheological properties.

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12. Claims 18 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over '836 as applied to claims 1-2 and 33 and further in view of Mettenbrink (U.S. Patent 4,775,080, hereafter '080).

'836 is described above. '836 also teaches that the apparatus comprises pressure adjusting and controlling means to dispense the paste (col. 7, lines 48-54). '836 does not teach that the pressure may be designed to be negative. However, clogging of the nozzle is taught as disadvantageous (col. 9, lines 59-62). It is well known to prevent the formation of dried beads of material that clog nozzles by applying a vacuum to the nozzle when the dispensing stops. As an example, '080 teaches the operation of a toothpaste dispenser, in which a vacuum is formed in the nozzle that avoids the formation of a plug of hardened paste outside the nozzle (col. 8, lines 33-40). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have allowed the adjusting means of '836 to apply a negative pressure to draw undispensed material back into the nozzle at the end of dispensing in order to prevent clogging of the nozzles.

13. Claims 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over '836 as applied to claim 1 above and further in view of Osaka '840.

'836 does not teach Applicant's specifically claimed ranges of the grain size, specific surface area, or paste viscosity.

'840 teaches that the particle size and viscosity of phosphor pastes are known to affect the light-emitting characteristics and resolution (col. 3, lines 8-39 and Abstract). The size distribution necessarily affects the specific surface area. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the size distribution, specific surface area and paste viscosity of '553 for the best light-emitting characteristics and resolution.

14. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over '836 as applied to claims 1 and 2 above and further in view of Igarashi et al. (U.S. Patent 4,792,723, hereafter '723).

'836 teaches the method of claims 1 and 2 as detailed above, but does not teach the use of terpineol as the solvent for the paste. However, terpineol is a conventional paste solvent for

phosphor pastes. See, for instance, '723, col. 3, line 50-col. 4, line 6. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used terpineol as the solvent of '836 with the expectation of similar results.

15. Claims 57 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanto '836 as applied to claims 1, 2, and 33 above, and further in view of Shinoda '553.

Claim 57: '836 teaches the limitations of claim 33, but do not explicitly teach that the apparatus includes means to remove undesired deposits of phosphor paste. '553 explicitly teaches that phosphor is not desired on top of the barrier ribs of a plasma display panel (col. 12, lines 16-26). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have removed any phosphor accidentally deposited on top of the barrier ribs in the invention of '836.

Claim 60: '836 reference is silent as to the phosphor layer thickness, and therefore does not teach the thickness of the coating on the bottom (T1) and the side wall (T2).

However, '553 teaches that the thickness of the phosphor layer obtained after drying is a result-effective parameter and that there is a trade-off between brighter displays achieved by thicker layers and lower discharge initialization voltages necessary for thinner layers. '553 teaches that layers of 10-50 microns are preferred. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the method of '836 to have produced phosphor layer thicknesses of 10-50 microns. While there is no teaching regarding the ratio of the thickness of the layer on the bottom (T1) and the side wall (T2), any values independently chosen from the preferred range necessarily produce a ratio of  $0.2 \leq T1/T2 \leq 5$ .

16. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanto '836 as applied to claims 1 and 2 above in view of Shinoda '553 as applied to claim 57 above, and further in view of Yamaura '231.

'836 and '553 are described above, but do not teach the use of a photosensitive component in the phosphor paste. '231 teaches that phosphor pastes may include photosensitive components in order to perform further photolithographic processing. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a photosensitive component in the phosphor paste of '836 in order to make the process more

flexible by allowing further patterning by photolithography (for example, to remove, undesired material from the tops of the barrier ribs) (Abstract, col. 6, line 42-col. 7, line 10).

17. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over '836 in as applied to claims 1 and 2 above and further in view of Shinoda as applied to claim 57 above, Yamamura '231 as applied to claims 28 and 29 above, and Mizuno et al. (U.S. Patent 5,466,325, hereafter '325).

'836 is described above. It does not teach that phosphor deposited on top of the barrier ribs are removed by an adhesive material. However, '553 explicitly teaches that phosphor is not desired on top of the barrier ribs of a plasma display panel (col. 12, lines 16-26). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have removed any phosphor accidentally deposited on top of the barrier ribs in the invention of '836. Further, '231 suggests the inclusion of a photosensitive material in a phosphor paste to allow photolithographic processing, as described in the rejection of claims 28 and 29 over '553 in view of '231, above. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used such a photolithographic process to have removed the undesired portions of the phosphor paste. In such a case, the phosphor paste acts like the photoresist of a conventional photolithographic process.

'325 teaches the patternwise removal of photoresist material from a substrate using a pressure-sensitive adhesive. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an adhesive to remove the undesired portion of the phosphor paste in the embodiment suggested by '836, '553, and '231 with the expectation of similar results.

18. Claims 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over '836 as applied to claim 33 above, and further in view of Silverbrook (U.S. Patent 5,850,241, hereafter '241).

'836 teaches the limitations of claim 33, but does not teach that the nozzle is coated with a fluorine-based resin or amorphous carbon film. '241 teaches that ink-jet nozzles may be coated with hydrophobic films such as an amorphous carbon film (col. 38, line 66-col. 39, line 30) to prevent reaction between the nozzle and polar solvent-based inks. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a hydrophobically coated nozzle in order to deposit the paste of '836 when the desired paste uses a

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polar solvent as a vehicle to prevent interactions between the paste and the nozzle. '241 teaches amorphous carbon and fluorinated diamond films. The Examiner takes official notice that fluororesins are notoriously well-known hydrophobic coatings. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a fluorinated resin as the hydrophobic coating material with the expectation of similar results.

***Response to Arguments***

19. Applicant's arguments filed 4/10/2003 have been fully considered but they are not persuasive.

Regarding the rejections under 35 USC 112, 2nd paragraph, Applicant's amendment does not address the previous rejection of claim 12. The Examiner has attempted to provide a more specific explanation of the lack of clarity above. Claims 1 and 2 are rendered unclear by the insertion of the phrase "continuously coating" combined with the argument that such excludes screen printing because screen printing is a continuous coating process, as discussed above. Applicant's argument that "continuously applying" excludes a screen printing is unconvincing because Applicant has not explicitly defined "continuously applying" as excluding screen printing. Furthermore, even if Applicant had provided such an explicit definition, it would have been vague and indefinite because it would have been repugnant to the term "continuously applying" because screen printing is a method of "continuously applying". As far as the argument regarding written disclosure under 35 USC 112, 1<sup>st</sup> paragraph, Applicant appears to be attempting to define "continuously applying" as meaning any method of "continuously applying" that is not screen printing. Applicant does not have support for claim language of this breadth. Applicant discloses a nozzle deposition system, and no other methods of continuously applying that are not screen printing. Therefore, there is no indication that, at the time of filing, Applicant was in possession of the entire scope of the claimed invention.

Applicant's remarks regarding support for the range of "640-2000 holes" are noted, but the provision of specific examples within a range does not support the entirety of the range.

Applicant's argues that the phrase "to continuously supply paste" in claims 33 and 58 is supported by original claim 1. The argument is not convincing because Applicant has taken the phrase out of the context of claims 33 and 58. Claims 33 and 58 recite "...a phosphor paste supply is operatively connected to the paste applicator to continuously supply paste to the substrate..." Claim 1 does not provide support for such a connection.

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Applicant makes a similar argument regarding claim 2, breaking down claim 2 into small fragments. Applicant has broken the phrase “640 to 2000 outlet holes for one of red, green, or blue phosphor paste” into two fragments and attempted to demonstrate support for each. However, there is no support for the combination (i.e., the phrase as a whole).

Nanto ‘836 as primary reference:

Applicant argues that ‘836 is not prior art under 35 USC 103(a) because of the foreign priority document JP 08-336,713, filed 12/17/1996. The current claims are not entitled to the foreign priority date because JP 08-336,713 does not provide full support as defined by 35 USC 112, 1<sup>st</sup> paragraph for the substance of any of the claims. Accordingly, there is no evidence that Applicant had possession of the claimed invention as of the date of the foreign priority document. See MPEP 2136.05.

Shinoda ‘553 as primary reference:

Applicant argues that ‘553 does not disclose the use of 640-2000 outlet holes. However, the argument is unconvincing because the number of holes determines the area that can be printed and the structural integrity of the screen. Therefore, the determination of the number of outlet holes for use in the screen printing process is a result-effective variable, and one of ordinary skill in the art would have optimized the number of holes through routine experimentation. Applicant’s arguments are unconvincing in the absence of a showing of criticality for the claimed range. ‘553 teaches hole diameters within Applicant’s claimed range.

Applicant’s argument that ‘553 does not continuously coat is unconvincing because screen printing is a continuous coating process, as discussed above.

***Conclusion***

20. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (703)308-2331. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 4:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck, can be reached at (703) 308-2333.



Michael Cleveland  
6/12/03



SHRIVE P. BECK  
SUPERVISORY PATENT EXAMINER  
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